

**Amendments to the Specification:**

Please replace the title beginning at page 1, line 1, with the following amended title:

**METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE HAVING A  
CRYSTALLIZED SEMICONDUCTOR FILM**

Please replace the paragraph bridging pages 3 and 4 with the following amended paragraph:

The present invention is characterized in that thermal crystallization of a semiconductor film utilizing a metal element is performed after exposing the semiconductor film to a plasma atmosphere. As already discussed, the density of crystal nuclei can be increased, if the critical nucleus radius is made smaller and the surface energy and the chemical potential of the semiconductor film are changed by some type of method. In the present invention, the chemical potential of the semiconductor film is increased, and the density of crystal nuclei generated by the metal element is increased, by performing exposure of the semiconductor film to an atmosphere that has been made into a plasma. If the density of crystal nuclei generated is increased, the amount of time required for crystallization is shortened, and it becomes possible to suppress spontaneous nucleation. The crystalline semiconductor ~~[[film]]~~ films are embedded into crystal grains that grow with the metal elements as crystal nuclei, and it becomes possible to reduce the grain size with crystalline semiconductor films thus formed. Heat treatment may also be performed after exposing the semiconductor film, to which the metal element has been added, to the plasma atmosphere.

Please replace the paragraph beginning at page 18, line 20, with the following amended paragraph:

Further, when using a silicon oxide film, it can be formed by plasma CVD with a mixture of TEOS (tetraethyl orthosilicate) and O<sub>2</sub>, at a reaction pressure of 40 Pa, with the substrate temperature set to from 300 to 400°C, and by discharging at a high frequency (13.56 MHz) electric power density of 0.5 to 0.8 W/cm<sup>2</sup>. Good characteristics as a gate insulating film can be obtained by subsequently performing thermal annealing at a temperature of 400 to 500°C with respect to the silicon oxide film [[thus]] manufacture.

Please replace the paragraph beginning at page 26, line 18, with the following amended paragraph:

Note that it is necessary to exercise caution against damage to the element due to static electricity during film formation because the bank 712 is an insulating film. Carbon particles or metal particles are added to the insulating film that becomes the bank 712 material in Embodiment 8, the resistivity is lowered, and the generation of static electricity is controlled. The amount of carbon particles or metal particles added may be regulated so that the ~~restivity~~ resistivity becomes  $1 \times 10^6$  to  $1 \times 10^{12}$   $\Omega \text{m}$  (preferably between  $1 \times 10^8$  and  $1 \times 10^{10}$   $\Omega \text{m}$ ).

The listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;

providing the semiconductor film with a metal containing material after exposing the semiconductor film to the plasma; and

crystallizing the semiconductor film by heating after providing the metal containing material.

2. (Original) A method according to claim 1, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

3. (Original) A method according to claim 1, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

4. (Previously Presented) A method according to claim 1, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

5. (Original) A method according to claim 1, wherein the inert gas is argon.

6. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;

providing the semiconductor film with a metal containing material after exposing the semiconductor film to the plasma;

crystallizing the semiconductor film by heating after providing the metal containing material; and

performing laser annealing to the semiconductor film after crystallizing the semiconductor film.

7. (Original) A method according to claim 6, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

8. (Original) A method according to claim 6, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

9. (Previously Presented) A method according to claim 6, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

10. (Original) A method according to claim 6, wherein the inert gas is argon.

11. (Withdrawn) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least nitrogen;  
providing the semiconductor film with a metal containing material; and  
crystallizing the semiconductor film by heating after providing the metal containing material.

12. (Withdrawn) A method according to claim 11, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

13. (Withdrawn) A method according to claim 11, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

14. (Withdrawn) A method according to claim 11, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

15. (Withdrawn) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least nitrogen;  
providing the semiconductor film with a metal containing material;  
crystallizing the semiconductor film by heating after providing the metal containing material; and  
performing laser annealing to the semiconductor film after crystallizing the semiconductor film.

16. (Withdrawn) A method according to claim 15, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

17. (Withdrawn) A method according to claim 15, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

18. (Withdrawn) A method according to claim 15, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

19. (Withdrawn) A method of manufacturing a semiconductor device comprising the steps of:

    exposing a semiconductor film to a plasma of a gas comprising at least ammonia;

    providing the semiconductor film with a metal containing material; and

    crystallizing the semiconductor film by heating after providing the metal containing material.

20. (Withdrawn) A method according to claim 19, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

21. (Withdrawn) A method according to claim 19, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

22. (Withdrawn) A method according to claim 19, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

23. (Withdrawn) A method of manufacturing a semiconductor device comprising the steps of:

    exposing a semiconductor film to a plasma of a gas comprising at least ammonia;

    providing the semiconductor film with a metal containing material;

    crystallizing the semiconductor film by heating after providing the metal containing material; and

    performing laser annealing to the semiconductor film after crystallizing the semiconductor film.

24. (Withdrawn) A method according to claim 23, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

25. (Withdrawn) A method according to claim 23, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

26. (Withdrawn) A method according to claim 23, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

27. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas selected from the group consisting of inert gas, nitrogen gas, and ammonia gas;

providing the semiconductor film with a metal containing material after exposing the semiconductor film to the plasma; and

crystallizing the semiconductor film by heating after providing the metal containing material.

28. (New) A method according to claim 27, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

29. (New) A method according to claim 27, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

30. (New) A method according to claim 27, further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.



31. (New) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;

providing the semiconductor film with a metal containing material before exposing the semiconductor film to the plasma; and

crystallizing the semiconductor film by heating after providing the metal containing material.

32. (New) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;

providing the semiconductor film with a metal containing material before exposing the semiconductor film to the plasma;

crystallizing the semiconductor film by heating after providing the metal containing material; and

performing laser annealing to the semiconductor film after crystallizing the semiconductor film.

33. (New) A method of manufacturing a semiconductor device comprising the steps of:

exposing a semiconductor film to a plasma of a gas selected from the group consisting of inert gas, nitrogen gas, and ammonia gas;

providing the semiconductor film with a metal containing material before exposing the semiconductor film to the plasma; and

crystallizing the semiconductor film by heating after providing the metal containing material.

34. (New) A method according to claim 1, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.

35. (New) A method according to claim 6, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.

36. (New) A method according to claim 27, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.

37. (New) A method according to claim 31, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.

38. (New) A method according to claim 32, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.

39. (New) A method according to claim 33, wherein the metal containing material is provided by evaporation, ion injection, sputtering, or solution application.